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09/975,876	10/11/2001	Hirofumi Kawashima	S002-4864	9675

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EXAMINER

ADDISON, KAREN B

ART UNIT

PAPER NUMBER

2834

DATE MAILED: 06/12/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/975,876

Applicant(s)

KAWASHIMA, HIROFUMI

Examiner

Karen B Addison

Art Unit

2834

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-38 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 27 is/are allowed.
- 6) ☒ Claim(s) 1-6,8-13,15-26 and 28-38 is/are rejected.
- 7) ☒ Claim(s) 7 and 14 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 1.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Allowable Subject Matter

1. Claims 7,14 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: prior art fails to show a plurality of individual quartz integrated tuning fork resonator having at least one of a different shape and a different electrode configuration. Prior art also fails to disclose a tuning fork base having a first set of grooves provided on the obverse and reverse face of the tuning fork base and a second set of grooves provided on the obverse and reverse face of the tuning fork base such that there is a second groove between each adjacent pair of first grooves.

2. Claim 27 is allowed.

The following is a statement of reasons for the indication of allowable subject matter: prior art fails to show, a combination of individual resonator according to at least two of A, B, and C.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-5, 17-18 and, 21, are rejected under 35 U.S.C. 102(b) as being anticipated by Debely (4384232).

Debely discloses an quartz crystal resonator capable of vibrating in a flexural mode in fig.1-3, 4 and 6 comprising: a plurality of quartz crystal tuning fork tines (33,34), each tuning fork tine having sides and a central linear portion (fig.6), a quartz crystal tuning fork base (1) to which the plurality of quartz crystal tuning fork tines are attached; at least on groove provided (35) in the central linear portion of each of the plurality of tuning tines (33,34); at least one first electrode (39) provided inside each groove(35); and at least one second electrode(43) provided on the sides of the tuning fork tines; such that for each tuning fork tine each one of the at least one second electrode has an opposite electrical polarity to the electrical polarity of each one of the at least one first electrode. Debely also discloses at least one first electrode (39) inside the at least one groove (35) of a first tuning fork tine and the at least one second electrode (46) disposed on the sides of a second tuning fork tine having the same polarity, at least one second electrode (43) disposed on the sides of the first tuning fork tine and at least on first electrode (39) inside the at least one groove (35) of the second tuning fork tine having a second, opposite electrical polarity to the first electrical polarity. Wherein, the second electrode (43,46) on the outer facing side of each of the first and second tuning fork tines that are each adjacent to the other side of the same or another tuning fork tine on the tuning fork base, constitute two electrode terminals; and the width of each groove on the first and second tuning lines is greater that or equal to a width measured form an

outer edge of the groove to an outer edge of the tuning fork tine. Debely also discloses the grooves formed on the tuning fork tines containing at least one first electrode. Fig.6).

4. Claims 6,8,19 and 38 are rejected under 35 U.S.C. 102(b) as being anticipated by Dinger (4379244).

Dinger discloses in fig.1 a plurality of tuning fork tines capable of vibrating in flexural mode (2,3), a quartz crystal tuning fork base (4) having an obverse face and a reverse face (front and back surfaces), to which the plurality of quartz crystal tuning fork tines are attached to, a plurality of electrodes (conductors) provided in the grooves (11 and 12) of the tuning fork base, such that there is at least one electrode in each groove (11 and 12). Dinger also discloses the electrodes disposed opposite each other in the thickness direction of the grooves have the same polarity, and the electrodes disposed opposite the side of adjoining grooves having opposite polarities (fig.2).

Referring to claim 38

Dinger discloses in fig. 1 A quartz crystal tuning fork base; (4) a plurality of quartz crystal tines, each tine being parallelepiped in shape (2,3) and having: a base end (16) that is attached to the tuning fork base, and free top end opposite to the base end (front). Wherein the base end and the top end have a width and a length; a pair of central surfaces (fig.1), including a central upper surface and a central lower surface, the central surface and the central lower surface being opposite to one another, and both central upper and lower surfaces being perpendicular to the base top end, with the central upper and lower surfaces having a width and a height; and a pair of opposite first and second side surfaces, both of which are perpendicular to the base and top

ends and perpendicular to the central surfaces, with each of the first and second sides surfaces having length with each of the plurality of tuning fork tines being adjacent to at least one other tuning fork tine, and spaced apart therefrom on the tuning fork base by a predetermine distance , such that at least one of the first and second side surfaces of each tuning fork tine is adjacent to a side surface of at least one other adjacent tuning fork and is spaced apart therefrom by a predetermine distance between adjacent tuning fork tines; wherein a plurality of grooves(11,12) on the tuning fork base(4) at a juncture of the tines and the tuning fork base having at least one electrodes(conductor) in the grooves.

5. Claims 10 and 20 is rejected under 35 U.S.C. 102(b) as being anticipated by EerNisse (4592663).

EerNisse disclose a quartz resonator capable of flexural vibration mode in fig.1 comprising: a plurality of quartz crystal tuning fork tines (8,12); a quartz Crystal tuning fork base (16) to which the plurality of quartz crystal tuning tines are attached. Wherein; each of the quartz crystal tuning fork tines have a step difference portions; with there being at least one first electrode on each of the step difference portions (A and B) with there being at least one second electrode disposed on the side (36) of the crystal tuning fork tines and at least one first electrode (40) and at least one second electrode are of opposite electrical polarity.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 11-13, 15-16 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Debely (as seen above) in view of Konno(5824900).

As seen above Debely discloses the substantially the claim invention however, Debely do not disclose a plurality of individual resonator connected in series to at least one other individual resonator of the plurality of resonator at their corresponding respective quartz crystal tuning fork bases. Wherein, the resonator forms an angle of 0 to 30 degrees.

Konno teaches the concept of having a plurality of individual resonator having tuning fork tines (capable of flexural mode) in fig.2. Wherein the resonators are connected in series to at least one other individual resonator (12,11) of the plurality of resonator at their corresponding respective quartz crystal tuning fork bases (15) and electrically connected in parallel. Wherein, the resonator forms an angle of 0 to 30 degrees for the purpose of improving vibration transmission between resonators. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the resonator of Debely with the concept of Konno resonators for the purpose of improving vibration transmission between individual resonators.

Referring to claims 22 and 25

8. Claims 22 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dinger (as seen above) in view of Konno (5824900).

As seen above Dinger discloses the substantially the claim invention however, Dinger do not disclose a plurality of individual capable of vibrating in flexural mode.

Konno teaches the concept of having a plurality of individual resonator having tuning fork tines (capable of flexural mode) in fig.2. Wherein the resonators are connected in series to at least one other individual resonator (12,11) of the plurality of resonator at their corresponding respective quartz crystal tuning fork bases (15) for the purpose of improving vibration transmission between resonators. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the resonator of Dinger with the concept of Konno resonators for the purpose of improving vibration transmission between individual resonators.

Referring to claim s 23 and 26

9. Claims 23 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over EerNisse (4592663) in view of Konno (5824900).

As seen above EerNisse discloses the substantially the claim invention however, EerNisse do not disclose a plurality of individual capable of vibrating in flexural mode. Konno teaches the concept of having a plurality of individual resonator having tuning fork tines (capable of flexural mode) in fig.2. Wherein the resonators are connected in series to at least one other individual resonator (12,11) of the plurality of resonator at their corresponding respective quartz crystal tuning fork bases (15) for the purpose of

improving vibration transmission between resonators. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the resonator of EerNsse with the concept of Konno resonators for the purpose of improving vibration transmission between individual resonators.

Referring to claim 28-37

10. Claims 28-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over in Debely (4384232) in view of Fumitaka (WO0044092).

As seen above Debely discloses substantially the claim invention. However Debely do not disclose a resonator comprising: rectangular shape grooves located in the central portion of the tuning fork tines. Wherein there are 2 to about 12 and 2 to about 6 tuning fork tines.

Fumitaka discloses in fig. 1 a quartz crystal resonator capable of vibrating in flexural mode comprising: a plurality of tuning fork tines having rectangular shape grooves in the central upper and lower surfaces of each tuning fork tines for the purpose of reducing the size of the vibrator and obtaining a low CI value. Therefore, it would have been obvious to one having ordinary skill in the arts at the invention was made to modify the resonator of Debely with Fmitaka teaching of rectangular shape grooves; so that the vibrator can be easily machined in a reduce sized. It also would have been obvious to one having ordinary skill in the arts at the time the invention was made to select the number of tuning fork tines 2 to about 12 and 2 to about 6 to improve frequency and temperature characteristics since it has been held that discovering the optimum or workable ranges involves only routine skills in the arts. In re Aller, 105, USPQ233.

Application/Control Number: 09/975,876
Art Unit: 2834

Page 9

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karen B Addison whose telephone number is 703-306-5855. The examiner can normally be reached on 8:00 to 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nestor Ramirez can be reached on 703-308-1317. The fax phone numbers for the organization where this application or proceeding is assigned are 703-305-3431 for regular communications and 703-305-3431 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

KBA
May 30, 2003

Thomas M. Congherty
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